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EXAMINER

ROY, SIKHA

ART UNIT PAPER NUMBER

2879

DATE MAILED: 01/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/872,723

Applicant(s)

RODRIGUEZ ET AL.

Examiner

Sikha Roy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-22, 24 and 25 is/are rejected.
- 7) ☒ Claim(s) 23 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Acknowledgement is made of the Preliminary Amendment which has been entered.

Specification

The disclosure is objected to because of the following informalities:

The section 'Best Mode for Carrying Out the Invention' discloses the invention without any reference to the Figures of Drawing it is corresponding to.

Appropriate correction is required.

Claim Objections

Claim 7 is objected to because of the following informalities:

In claim 7 line 1 'layers have been are' must be replaced with -- layers have been -- to conform with grammatical rules.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 20 recites the limitation "the face plate" in claim 1. There is no citation of face plate in claim 1, rendering insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4,6-8,10-12,16 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 99/17330 to Cooper.

Regarding claim 1 Cooper discloses (Figs. 1 and 15, page 2 lines 1-8, page 3 lines 5-20, claim 1) a visual display 100 comprising a cathode plate including a substrate 1₁, 1₂ and emission layer 3 on one face of the substrate, the emission layer having a multiplicity of emitters and gates arranged as an array of emission pixels, conductive connections in the emission layer to the and gates, the substrate having conductive vias 17 provided through the substrate to at least some of the conductive connections in the emission layer 3 for electrical connection to emitters and gates, an anode plate (glass front face plate) 51, a back plate (back substrate layer) 1₄, the cathode plate being carried on the front side of the back plate and a frame (carrier) 40 connecting the back plate 1₄ to the anode plate (page 5 lines 14,15).

Referring to claim 2 Cooper discloses (Fig. 14, page 18 lines 5-10) the frame (carrier wall) 40 extends peripherally around the cathode plate.

Regarding claim 3 Cooper discloses (page 5 lines 24, 25) the frame is soldered to the back plate.

Regarding claim 4 the recitation of 'frame joined to the back plate by frit sealing' is drawn to a process of manufacturing which is incidental to the claimed apparatus. It is well established that a claimed apparatus cannot be distinguished over the prior art by a process limitation. Consequently, absent a showing of an unobvious difference between the claimed product and the prior art, the subject product-by-process claim limitation is not afforded patentable weight (see MPEP 2113). Therefore, it is the position of the examiner that it would have been obvious to one of ordinary skill in the art that the visual display disclosed by Cooper is at least a fully functional equivalent to the Applicant's claimed invention.

Regarding claim 6 Cooper discloses (page 4 line 7, page 6 lines 13-15) the frame 40 and back plate are laminated from multiple layers of ceramic material.

Regarding claim 7 Cooper discloses (page 9 lines 5-24) the layers are laminated and compressed together in 'green state' and then fired at elevated temperature to sinter the materials.

Regarding claim 8 Cooper discloses (page 19 lines 20-23) that the back plate 14 is pressure tight to atmospheric pressure and the atmospheric pressure acts on the back of the back plate and front of the anode plate.

Referring to claim 10 Cooper discloses (claims 6, 12 Fig. 6 page 13 lines 1-8) substrate of the cathode plate is a multilayer substrate having a front substrate layer and an additional substrate layer with conductive vias 20 provided through the front

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layer and each additional layer and with electrical interconnection tracks (connection strips) 19. Cooper further discloses the arrangement of adjacent layers with interconnection tracks and vias is such that the front layer via is off-set from the back one (vias in zig zag array with gaps in between). The vias being not co-axial provides greater assurance of vacuum tightness.

Referring to claim 11 Cooper discloses the arrangement of vias and electrical interconnection tracks in a multi layer substrate, the adjacent layers being such that the vias in two layers are aligned (page 14 lines 1,2).

Regarding claim 12 Cooper discloses (Figs. 9 and 10 page 15 lines 22-24) the substrate of the cathode plate can have a single ceramic layer with an emission layer 503 built up on it.

Regarding claim 16 it is clearly evident from Fig. 1 that the back plate (comprising 1₃, 1₄) has vias in a front layer positioned to connect with vias in the back of the cathode plate (1₁, 1₂).

Regarding claim 17 Cooper discloses (claim 9) in Fig. 1 that the display includes connection tracks 19 on either of the back plate front layer or the cathode plate back layer.

Regarding claim 24 Cooper discloses that the anode plate (front plate) is sealed to the frame (carrier) by a sealing wall of glass frit.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5,9,13-15 and 18,19,25 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/17330 to Cooper.

Regarding claim 5 Cooper discloses (page 5 lines 14-22) the frame (carrier) separate from the back plate with L-shape, one limb extending towards the anode plate.

Claim 5 differs from Cooper in that Cooper does not exemplify the frame and the back plate provided as a single structure.

It would have been obvious to one of ordinary skill in the art at the time of invention to make the frame and the back plate as single structure since it has been held that forming in one piece an article which has formerly been formed in separate pieces and put together involves only routine skill in the art. Furthermore this configuration with the frame and the back plate as single structure would eliminate the step of aligning and joining the frame and the back plate thus providing simpler manufacturing of the display.

Regarding claim 9 Cooper discloses (claims 38,39) array of spacers including vias and contact tracks for connecting the phosphor pixels to the drivers between the anode plate and the emission device.

Cooper does not disclose the frame incorporating a network of vias and interconnection tracks for electrical connection of the anode.

The frame (carrier) in the display device of Cooper provides the connection between the back plate and the anode plate and acts as a spacer. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to replace the spacers with the frame connecting the back plate and the anode plate having vias and contact tracks for connecting the phosphor pixels with the driving contacts carried on the emission device.

Regarding claim 13 Cooper discloses the claimed invention except for the cathode plate having a thicker foundation layer. It would have been obvious matter of design choice to have thicker foundation layer since applicant has not disclosed that thicker foundation layer solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the multilayers of the substrate in cathode plate having same thickness and then fired as disclosed by Cooper.

Regarding claim 14 Cooper discloses the claimed invention except for the back plate having a thicker foundation layer. It would have been obvious matter of design choice to have thicker foundation layer since applicant has not disclosed that thicker foundation layer solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the multilayers of the substrate in back plate having same thickness and then fired as disclosed by Cooper.

Regarding claim 15 Cooper discloses (page 13 lines 1-6 page 16 lines 10-13, Figs. 11,12) the vias in the back plate layers are arranged to spread or fan out towards the next layer for so that the connection strips can be connected to driver chip contacts. As with substrate layers in cathode plate, vias in back plate can be arranged such that vias in the front layers being off-set with those in the next adjacent layer.

Referring to claims 18 and 19 Cooper discloses (page 8 lines 10-15) the vias on the back plate front layer or cathode plate back layer are filled with conductive material and the tracks are positioned to interconnect respective vias. Cooper does not disclose the inter connection made by solder or ball grid array.

The selection of known material for a known purpose is generally within the skill of the art. It would have been obvious to use solder or ball grid array for electrically connecting vias and the tracks on cathode plate and back plate because the selection of solder (or ball grid array) for purpose of adhesion and electrical connection is within the skill of the art. Furthermore Cooper discloses using high temperature solders for connecting contact pad and tracks 21,22 to the substrate 1(Fig. 15).

Regarding claim 25 Cooper discloses anode plate sealed to the frame by fused frit seal. Cooper does not disclose fused solder for sealing the anode plate to the frame. It is well within the teaching of art to use fused solder for electrical connection between two components. The selection of known material for a known purpose is generally within the skill of the art. Therefore it would have been obvious to use fused solder for sealing the anode plate to the frame for joining the two and providing electrical connection.

Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/17330 to Cooper and further in view of U.S. Patent 5,766,053 to Cathey et al.

Claim 20 differs from Cooper in that Cooper does not disclose a flowable connection made around the back edge of the cathode plate to the back plate isolating a thin gap between the cathode plate and the back plate.

Cathey in analogous art of flat-panel field emission display panel discloses (Fig. 1 column 4 lines 31-41) flowable connection (rear positioning spacer made of frit seal) 27 is made around the back edge of the cathode plate 16 to the back plate 14 isolating a thin gap 36 between the two components. Cathey further discloses that this configuration creates a rearward vacuum space behind the cathode plate and a forward vacuum space in front of the cathode plate and hence the cathode plate is not subjected to the differential pressure on opposite sides. This embodiment eliminates pressure differential between the sides of the cathode plate. This reduces structural requirements, eliminating the need for distributed spacers.

Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use a flowable connection around the back edge of the cathode plate isolating a thin gap between the cathode plate and the back plate of Cooper as taught by Cathey for eliminating pressure differential between the sides of the cathode plate and hence reducing structural requirements, eliminating the need for distributed spacers.

Regarding claim 21 Cathey discloses the flowable connection is of glass frit.

Claim 22 recites the same limitation as of claim 18 and hence is rejected for the same reason. Furthermore Cooper discloses (page 24 lines 3-5) high temperature solder (having melting point of 300°C) used for providing electrical connections.

Allowable Subject Matter

Claim 23 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record neither teaches nor suggests a visual display with the limitations as claimed in claim 23 and particularly the limitation of back plate provided with plugged apertures and back side of the cathode plate provided with recesses.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. patent 6,577,057 to Yamamoto et al. discloses display device with multi-layer ceramic cathode plates and frit filled vias. U.S. Patent 5,614,781 to Spindt et al. discloses anode plate with notches for alignment of spacers.

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Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikha Roy whose telephone number is (571) 272-2463. The examiner can normally be reached on Monday-Friday 8:00 a.m. – 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (571) 272-2457. The fax phone number for the organization is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

S.R.

Sikha Roy
Patent Examiner
Art Unit 2879



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